Int. J. Oral Maxillofac. Surg. 2017; xxx: xxx–xxx
http://dx.doi.org/10.1016/j.ijom.2017.03.020, available online at http://www.sciencedirect.com

International Journal of Oral & Maxillofacial Surgery

Clinical PaperCleft lip and palate

Gingival esthetics and oral health-related quality of life in patients with cleft lip and palate

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F. Stelzle, M. Rohde, N. Oetter, K. Krug, M. Riemann, W. Adler, F.W. Neukam, C. Knipfer: Gingival esthetics and oral health-related quality of life in patients with cleft lip and palate. Int. J. Oral Maxillofac. Surg. 2017; xxx: xxx–xxx.

Abstract. While the oral health-related quality of life (OHRQoL) is known to be reduced in patients with cleft lip and palate (CLP), its inter-dependency with the soft tissue characteristics of the CLP area remains unclear. This study aimed to evaluate the soft tissue characteristics in the treated cleft area in order to investigate whether gingival esthetics correlate with OHRQoL. Thirty-six patients with unilateral or bilateral CLP (46 cleft areas) were investigated after secondary/tertiary alveolar bone grafting and orthodontic/prosthetic implant treatment using an adapted score to rate gingival esthetics (clinical esthetic score, CES). The patient's OHRQoL was determined using the German short version of the Oral Health Impact Profile questionnaire (OHIP-G14). The results showed a significantly better rating in patients with their own teeth in situ (12.05 ± 1.10) than in patients with implants (6.95 ± 4.78) or prosthetics (4.00 ± 3.58). The best OHRQoL values were achieved by patients with their own teeth integrated into the cleft area (1.32 ± 2.31), followed by patients with implants (2.33 ± 2.33) and prosthetics (3.75 ± 5.87). A significant ($P = 0.017$) correlation was found between OHIP-G14 and CES scores, suggesting an increased OHRQoL in cases with higher oral esthetics in the cleft area. The therapeutic strategy contributes to both gingival esthetics and OHRQoL. The patient's subjective perception of OHRQoL can be attributed to objective gingival esthetic ratings.

Key words: esthetic; oral health-related quality of life; cleft lip and palate; oral soft tissue.

Accepted for publication 14 March 2017

With an incidence of approximately one in every 500–1100 live births, the development of a cleft lip and/or palate (CLP) is one of the most common congenital malformations worldwide[1]. The established surgical treatment for closure of the cleft alveolar ridge is the alveolar bone graft. With this treatment, cancellous bone from, for example, the iliac spine, mandible, or tibia is placed in the cleft region and covered with a mucoperiosteal flap[2].

Despite the complex therapy strategies, the surgical treatment of patients with CLP is a well-established procedure with reported success rates ranging from 73% to 93% based on the functional outcome and anatomical parameters[3,4].

Many different rating criteria, from skeletal growth of the midface to the nasolabial esthetic appearance, have been applied to assess the success of CLP treatment[5–7]. However, objectively successful treatment does not necessarily equal satisfied patients: poor patient information, patient self-perception, and unrealistic treatment outcome expectations may produce a mismatch between professional expert ratings and individual patient ratings[8].

0901-5027/000001+07

In this context, both objective and subjective parameters for successful treatment have been shown to influence the patient's oral health-related quality of life (OHRQoL), which is defined as the subjective perception of how one's well-being is affected by functional, psychological, and social factors related to oral health. This includes self-esteem, experiencing pain or discomfort, and the esthetic oral appearance[9].

The condition and shape of the gingiva is seen as a main criterion for the esthetic oral appearance. Surgical treatment may lead to soft tissue scarring and influence the overall gingival appearance, and periodontal diseases are known to manifest more frequently in patients with CLP. There is, however, no standardized scoring system to objectively rate the esthetic oral soft tissue appearance of patients with CLP[10–12].

In the present study, a scoring system was developed based on the seven variables included in the 'pink esthetic score' (PES) of Furhauser et al.[13,14]. The German short version of the Oral Health Impact Profile questionnaire (OHIP-G14) was used to assess OHRQoL[15,16]. The aim of the study was to investigate which dental and surgical treatment options are most likely to positively influence the oral esthetic appearance and to identify the impact of gingival esthetics on OHRQoL in this group of patients.

Materials and methods

Patients

Thirty-six patients (20 male, 16 female) with unilateral or bilateral CLP were examined (Table 1). All patients had undergone secondary or tertiary alveolar bone grafting at least 6 months prior to the examination. To avoid any bias in the outcome of gingival esthetics, all surgical procedures were performed by the same surgical team. Patients under 12 and over 40 years of age were excluded from the study to prevent any bias resulting from gingival alterations[17]. Those cases with incomplete eruption of the teeth in or around the treated cleft area were also excluded. No patient included in the study revealed any sign of a systemic disease that might have influenced the outcome of the OHIP-G14 or CES scores.

Table 1. Overview of the patient population according to the type of cleft, dental treatment, and episode of surgery: descriptive statistics.

Cleft type	Unilateral	Bilateral		Total
Patients (*n*)	26	10		36
Cleft sites	26	Left 10	Right 10	46
Dental treatment				
Own tooth	18	4	4	26
Implant	5	1	1	7
Prosthetic	3	5	5	13
Osteoplastic surgery				
Secondary	19	6	6	31
Tertiary	7	4	4	15

Esthetic appearance of oral soft tissue

The gingival esthetic appearance was measured using seven variables derived from the 'clinical esthetic score' (CES), based on the PES[13,14] (Table 2). The data were collected by a senior oral and maxillofacial surgeon during regular clinical examinations in the outpatient clinic.

The investigated area was defined as the teeth, implants, or dental prostheses (including dental crowns and bridges) in the treated former cleft region, as well as the mesial and distal teeth adjacent to it (mesial tooth + former cleft + distal tooth). To allow for the assessment of unilateral as well as bilateral CLP cases in an unbiased manner, all cases were rated relative to the healthy standard dentition of a 20-year-old male. A score ranging from 0 (worst possible appearance relative to reference dentition) to 2 (best possible appearance relative to reference dentition) was assigned to each variable. Thus, a total value of between 0 (worst) and 14 (best) could be scored to represent the esthetic gingival appearance of each tooth, prosthesis/crown/bridge, or implant in the treated cleft region in relation to the healthy standard dentition. The mean ± standard deviation values for each region (tooth, implant, or prosthesis in the cleft, as well as the mesial and distal teeth/implants/prostheses/crowns/bridges adjacent to it) and the total value were calculated.

For the statistical analysis, every cleft area was defined as a single case, resulting in 46 rated sites for 36 patients (26 unilateral CLP, 10 bilateral CLP). These cases were then classified according to the type of dental treatment found in the cleft region: (1) patients with their own tooth in situ ('tooth' cohort); (2) patients with an

Table 2. The seven variables included in the clinical esthetic score (CES); the reference tooth is that of a standardized reference dentition.

Variables			Score		
			0	1	2
1	Mesial papilla	Characteristics compared to reference tooth	Absent	Incomplete	Complete
2	Distal papilla	Characteristics compared to reference tooth	Absent	Incomplete	Complete
3	Level of soft tissue	Level compared to reference tooth	Difference > 2 mm	Difference 1–2 mm	Difference < 1 mm
4	Shape of soft tissue	Naturalness compared to reference tooth	Unnatural form	Rather natural form	Natural form
5	Alveolar crest	Deficit on alveolar crest	Distinct deficit	Small deficit	No deficit
6	Naturalness of soft tissue color	Color compared to reference tooth	Distinct difference	Moderate difference	No difference
7	Structure of soft tissue	Structure compared to reference tooth	Distinct difference	Moderate difference	No difference

Please cite this article in press as: Stelzle F, et al. Gingival esthetics and oral health-related quality of life in patients with cleft lip and palate, *Int J Oral Maxillofac Surg* (2017), http://dx.doi.org/10.1016/j.ijom.2017.03.020